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Serial: RNP-RA/14-0081

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10 CFR 50.73

Attn: Document Control Desk
United States Nuclear Regulatory Commission
Washington, DC 20555-0001

H. B. ROBINSON STEAM ELECTRIC PLANT, UNIT NO. 2
DOCKET NO. 50-261/RENEWED LICENSE NO. DPR-23

LICENSEE EVENT REPORT NOS. 2013-001-01, 2013-003-01, 2014-001-01 REVISIONS TO
INCLUDE AND/OR CLARIFY REQUIRED INFORMATION

Ladies and Gentlemen:

Pursuant to 10 CFR 50.73, Duke Energy Progress, Inc. is submitting the attached Licensee Event Report revisions. The revisions provide additional information required by 10 CFR 50.73(b)(2)(ii)(F), 10 CFR 50.73(b)(2)(ii)(J) and NRC Form 366, Item 13. Should you have any questions regarding this matter, please contact Mr. R. Hightower, Manager - Nuclear Regulatory Affairs at (843) 857-1329.

This submittal contains no new Regulatory Commitments.

Sincerely,

W. R. Gideon
Site Vice President
H. B. Robinson Steam Electric Plant, Unit No. 2

WRG/jmw

Attachments:

- I. LER 2013-001-01: Non-Environmentally-Qualified Splice Rendered Post Accident Monitoring Instrumentation Channel Inoperable
 - II. LER 2013-003-01: Reactor Trip on 4KV Bus Undervoltage During Load Transfer
 - III. LER 2014-001-01: Reactor Trip Due to a Two-out-of-Three Logic Signal from Steam Generator Water Level Protection Train B Logic Matrix
- c: V. McCree, NRC, Region II
Ms. Martha C. Barillas, NRC Project Manager, NRR
NRC Resident Inspector, HBRSEP, Unit No. 2

US NRC Document Control Desk
Attachment III to Serial: RNP-RA/14-0081
4 pages (including this cover page)

H. B. ROBINSON STEAM ELECTRIC PLANT UNIT 2

LICENSEE EVENT REPORT NO. 2014-001-01

**REVISION TO REACTOR TRIP DUE TO A TWO-OUT-OF-THREE LOGIC SIGNAL FROM
STEAM GENERATOR WATER LEVEL PROTECTION TRAIN B LOGIC MATRIX**

**LICENSEE EVENT REPORT (LER)**(See Page 2 for required number of
digits/characters for each block)

Estimated burden per response to comply with this mandatory collection request: 80 hours. Reported lessons learned are incorporated into the licensing process and fed back to industry. Send comments regarding burden estimate to the FOIA, Privacy and Information Collections Branch (T-5 F53), U.S. Nuclear Regulatory Commission, Washington, DC 20555-0001, or by internet e-mail to Infocollections.Resource@nrc.gov, and to the Desk Officer, Office of Information and Regulatory Affairs, NEOB-10202, (3150-0104), Office of Management and Budget, Washington, DC 20503. If a means used to impose an information collection does not display a currently valid OMB control number, the NRC may not conduct or sponsor, and a person is not required to respond to, the information collection.

1. FACILITY NAME

H. B. Robinson Steam Electric Plant, Unit No. 2

2. DOCKET NUMBER

05000 261

3. PAGE

1 OF 3

4. TITLE

Reactor Trip Due to a Two-out-of-Three Logic Signal from Steam Generator Water Level Protection Train B Logic Matrix

| 5. EVENT DATE | | | 6. LER NUMBER | | | 7. REPORT DATE | | | 8. OTHER FACILITIES INVOLVED | |
|-------------------|-----|------|---|-------------------|---|----------------|--|------|---|---------------|
| MONTH | DAY | YEAR | YEAR | SEQUENTIAL NUMBER | REV NO. | MONTH | DAY | YEAR | FACILITY NAME | DOCKET NUMBER |
| 01 | 09 | 2014 | 2014 | 001 | 01 | 08 | 05 | 2014 | FACILITY NAME | DOCKET NUMBER |
| | | | | | | | | | | 05000 |
| 9. OPERATING MODE | | | 11. THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR §: (Check all that apply) | | | | | | | |
| 1 | | | <input type="checkbox"/> 20.2201(b) | | <input type="checkbox"/> 20.2203(a)(3)(i) | | <input type="checkbox"/> 50.73(a)(2)(i)(C) | | <input type="checkbox"/> 50.73(a)(2)(vii) | |
| | | | <input type="checkbox"/> 20.2201(d) | | <input type="checkbox"/> 20.2203(a)(3)(ii) | | <input type="checkbox"/> 50.73(a)(2)(ii)(A) | | <input type="checkbox"/> 50.73(a)(2)(viii)(A) | |
| | | | <input type="checkbox"/> 20.2203(a)(1) | | <input type="checkbox"/> 20.2203(a)(4) | | <input type="checkbox"/> 50.73(a)(2)(ii)(B) | | <input type="checkbox"/> 50.73(a)(2)(viii)(B) | |
| | | | <input type="checkbox"/> 20.2203(a)(2)(i) | | <input type="checkbox"/> 50.36(c)(1)(i)(A) | | <input type="checkbox"/> 50.73(a)(2)(iii) | | <input type="checkbox"/> 50.73(a)(2)(ix)(A) | |
| 10. POWER LEVEL | | | <input type="checkbox"/> 20.2203(a)(2)(ii) | | <input type="checkbox"/> 50.36(c)(1)(ii)(A) | | <input checked="" type="checkbox"/> 50.73(a)(2)(iv)(A) | | <input type="checkbox"/> 50.73(a)(2)(x) | |
| | | | <input type="checkbox"/> 20.2203(a)(2)(iii) | | <input type="checkbox"/> 50.36(c)(2) | | <input type="checkbox"/> 50.73(a)(2)(v)(A) | | <input type="checkbox"/> 73.71(a)(4) | |
| | | | <input type="checkbox"/> 20.2203(a)(2)(iv) | | <input type="checkbox"/> 50.46(a)(3)(ii) | | <input type="checkbox"/> 50.73(a)(2)(v)(B) | | <input type="checkbox"/> 73.71(a)(5) | |
| | | | <input type="checkbox"/> 20.2203(a)(2)(v) | | <input type="checkbox"/> 50.73(a)(2)(i)(A) | | <input type="checkbox"/> 50.73(a)(2)(v)(C) | | <input type="checkbox"/> OTHER | |
| | | | <input type="checkbox"/> 20.2203(a)(2)(vi) | | <input type="checkbox"/> 50.73(a)(2)(i)(B) | | <input type="checkbox"/> 50.73(a)(2)(v)(D) | | Specify in Abstract below or in NRC Form 366A | |

12. LICENSEE CONTACT FOR THIS LER

LICENSEE CONTACT

R. Hightower, Manager - Nuclear Regulatory Affairs

TELEPHONE NUMBER (Include Area Code)

(843) 857-1329

13. COMPLETE ONE LINE FOR EACH COMPONENT FAILURE DESCRIBED IN THIS REPORT

| CAUSE | SYSTEM | COMPONENT | MANU-FACTURER | REPORTABLE TO EPIX | CAUSE | SYSTEM | COMPONENT | MANU-FACTURER | REPORTABLE TO EPIX |
|-------|--------|-----------|---------------|--------------------|-------|--------|-----------|---------------|--------------------|
| X | JC | CNTR | WSTGHSE | Y | | | | | |

14. SUPPLEMENTAL REPORT EXPECTED☐ YES (If yes, complete 15. EXPECTED SUBMISSION DATE) ☒ NO**15. EXPECTED SUBMISSION DATE**

MONTH DAY YEAR

ABSTRACT (Limit to 1400 spaces, i.e., approximately 15 single-spaced typewritten lines)

At 2234 hours EST on 1/9/2014, with the Unit in Mode 1 at 100% power, H. B. Robinson Steam Electric Plant, Unit 2 experienced an automatic reactor trip/turbine trip during the performance of Steam Generator (SG) Water Level Protection Channel testing. The 'B' reactor trip breaker opened as a result of its 2/3 SG Lo-Lo Level input logic being satisfied. This occurred when one channel contact was "open" due to foreign material lodged between the contact faces and the second channel contact was opened during channel testing. The opening of the 'B' reactor trip breaker resulted in a turbine trip followed by a reactor trip. Auxiliary Feedwater automatically started as expected. There were no other equipment performance issues.

The cause of this event was degradation of passive components (wire labels) in the Reactor Protection System (RPS) relay rack. Degraded wire labels were the source of the foreign material which became lodged in an RPS relay contact creating an undetected half-trip condition.

The foreign material was removed from the RPS relay contact. Both trains of RPS were tested to verify proper functioning of each RPS relay, and both trains of RPS relay racks were inspected to confirm no foreign material was present which could affect proper operation of the RPS relays.

**LICENSEE EVENT REPORT (LER)
CONTINUATION SHEET**

Estimated burden per response to comply with this mandatory collection request: 80 hours. Reported lessons learned are incorporated into the licensing process and fed back to industry. Send comments regarding burden estimate to the FOIA, Privacy and Information Collections Branch (T-5 F53), U.S. Nuclear Regulatory Commission, Washington, DC 20555-0001, or by internet e-mail to Infocollects.Resource@nrc.gov, and to the Desk Officer, Office of Information and Regulatory Affairs, NEOB-10202, (3150-0104), Office of Management and Budget, Washington, DC 20503. If a means used to impose an information collection does not display a currently valid OMB control number, the NRC may not conduct or sponsor, and a person is not required to respond to, the information collection.

| 1. FACILITY NAME | 2. DOCKET | 6. LER NUMBER | | | 3. PAGE |
|---|-----------|---------------|----------------------|------------|---------|
| H. B. Robinson Steam Electric Plant, Unit No. 2 | 05000 261 | YEAR | SEQUENTIAL NUMBER | REV NO. | 2 OF 3 |
| | | 2014 | - 001 | - 01 | |

NARRATIVE**PLANT IDENTIFICATION**

Westinghouse - Pressurized Water Reactor

BACKGROUND

At 2234 hours EST on 1/9/2014, with the Unit in Mode 1 at 100% power and no structures, systems or components out of service that contributed to this event, H. B. Robinson Steam Electric Plant, Unit No. 2 (HBRSEP2) experienced an automatic reactor [RCT] trip during the performance of Steam Generator (SG) [SG] Water Level Protection Channel [CHA] testing. This event is reportable under 10 CFR 50.73(a)(2)(iv)(A) due to the event resulting in an automatic actuation of the Reactor Protection System (RPS) and Auxiliary Feedwater System (AFW).

The RPS monitors all parameters related to safe operation of the reactor. The system is designed to protect the core against fuel rod cladding damage caused by departure from nucleate boiling, and to protect the Reactor Coolant System (RCS) against damage caused by overpressure. The Low-Low SG Water Level Trip circuit protects the SG in case of a sustained steam/feedwater flow mismatch of insufficient magnitude to cause a flow mismatch reactor trip. This reactor trip circuit actuates on two-out-of-three low-low water level signals in any SG.

Maintenance Surveillance Test (MST)-013, "Steam Generator Water Level Protection Channel Testing," provides the instruction necessary for performing the Surveillance Test which will determine the operability of the SG Water Level Protection Channel Sets I, II, and III.

MST-021, "Reactor Protection Logic Train 'B' at Power," provides the instructions necessary to determine the operability of Reactor Protection Logic Train 'B'.

EVENT DESCRIPTION

At 2234 on 1/9/2014, with the Unit in Mode 1 at 100% power and during the performance of MST-013, HBRSEP2 experienced an automatic reactor trip. SG Water Level Channel III [CHA] was tested in accordance with MST-013 and returned to service upon verification that all bistables [RLY] and alarms [ALM] were cleared. However, unbeknownst to technicians, contact 2-6 [CNTR] on relay LC-496A1-X(B) [RLY] was in the half-tripped condition (i.e., two-out-of-three logic with one of the two needed channels already in the 'tripped' state) and not annunciated in the Control Room. When technicians proceeded with MST-013 placing SG Water Level Channel I [CHA] in the tripped condition, a two-out-of-three logic signal was generated causing the 'B' Reactor Trip Breaker [BKR] to open, causing the turbine [TRB] trip followed by a reactor trip signal which opened the 'A' Reactor Trip Breaker [BKR]. AFW automatically started as expected. There were no other equipment performance issues.

Circuit troubleshooting revealed that the Westinghouse LC-496A1-X(B) 2-6 contact ('B' train), while appearing to be in the correct position, had 133.2 volts direct current (VDC) across it (i.e., showing an open contact). This contact failure, coupled with the LC-494A1-X(B) contacts [CNTR] being open from the Channel I test, broke continuity to the relays for the 'B' train, which broke continuity to the 'B' reactor trip breaker [BKR] undervoltage coil [CL] and automatic shunt trip coil [CL], causing the 'B' reactor trip breaker to open. The trip of the 'B' reactor trip breaker initiated a turbine trip, as expected. Per design, a turbine trip results in a reactor trip at greater than 40% reactor power and led to the reactor trip breaker opening and subsequent reactor trip.

During a visual examination of relay LC-496A1-X(B) after being removed from the RPS relay rack [RK], it was discovered that a small piece of plastic material was wedged between the plates of its 2-6 contact. The material, determined to be a piece of a degraded wire label that had become dislocated from a wire, prevented the contacts from fully closing. Since relay LC-496A1-X(B) passed surveillance test MST-021 performed on 12/02/2013, it has been concluded that the foreign material fell into the relay contacts after this test and prior to MST-013 testing on 1/9/2014.

LICENSEE EVENT REPORT (LER) CONTINUATION SHEET

| 1. FACILITY NAME | 2. DOCKET | 6. LER NUMBER | | | 3. PAGE |
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NARRATIVE

CAUSAL FACTORS

The direct cause of the reactor trip event is foreign material preventing closure of contacts 2-6 of relay LC-496A1-X(B). This created an undetected condition of having one channel of the 'C' SG low-low level protection matrix in a tripped condition. When another channel was placed in the tripped condition for testing, the reactor trip breaker circuit was opened causing the reactor trip.

CORRECTIVE ACTIONS

Completed:

1. The foreign material was removed from the RPS relay contact.
2. Both trains of RPS relays were tested to verify satisfactory operation and that no foreign material was present that could prevent correct relay operation.
3. Both trains of relay racks were inspected to identify and remove any potential foreign material that could adversely affect proper operation of RPS relay contacts.
4. Revision of the model work order instructions for the relay rack clean-and-inspect preventive maintenance procedures to include inspection of wiring, labels, cable raceways and other passive components for evidence of degradation.

Planned:

1. Replacement of wire labels in reactor protection and safeguards relay racks. Action Request (AR) No. 654789 Assignment Nos. 06 & 29

SAFETY ANALYSIS

The reactor was operating at full power during the performance of MST-013 when an automatic reactor trip occurred. The mitigating equipment, including AFW functioned as expected and plant shutdown proceeded normally without further challenge. The cause of the plant trip was determined to be foreign material lodged between two contacts utilized during the performance of MST-013. The trip logic performed as designed and there were no other equipment performance issues. Therefore, the risk consequence of this event was small based on a successful reactor trip with no equipment or operational challenges.

ADDITIONAL INFORMATION

A search of internal and external operating experience for the previous three years did not identify any events that could have prevented the failure of relay contacts due to degrading wire labels.

Energy Industry Identification System (EIIIS) codes for systems and components relevant to this event are identified in the text of this document within brackets [].